

Lower Macquarie Alluvial Groundwater Sources

Groundwater annual report 2022

Introduction

This report is a summary of water accounts, volume pumped and groundwater levels for the Lower Macquarie alluvial groundwater sources for the period 1 July 2021 to 30 June 2022, including the start of year water account volumes for the 2022/2023 water year. It will be updated regularly.

For detailed information of the hydrogeology, management and past long-term water level behaviour of these water sources refer to the Groundwater Resource Description Report for the Macquarie-Castlereagh Alluvium:

www.industry.nsw.gov.au/_data/assets/pdf_file/0017/192221/macquarie-castlereagh-alluvium-appendix-a-water-resource-description.pdf

Description

The Lower Macquarie groundwater sources are located within the Macquarie-Castlereagh River catchment. Six separate groundwater sources make up the Lower Macquarie, three of these are alluvial (included in this report):

- Lower Macquarie Zone 1 Groundwater Source
- Lower Macquarie Zone 2 Groundwater Source
- Lower Macquarie Zone 6 Groundwater Source

The north-south boundary between Zones 1 and 6 extends through Narromine. Zone 1 continues for approximately 15.5 km until it reaches Zone 2 (**Figure 1**).

The Lower Macquarie alluvial groundwater sources comprise unconsolidated clay, silt, sand and gravel deposited within valleys and across flood plains by the Macquarie River and its tributaries.

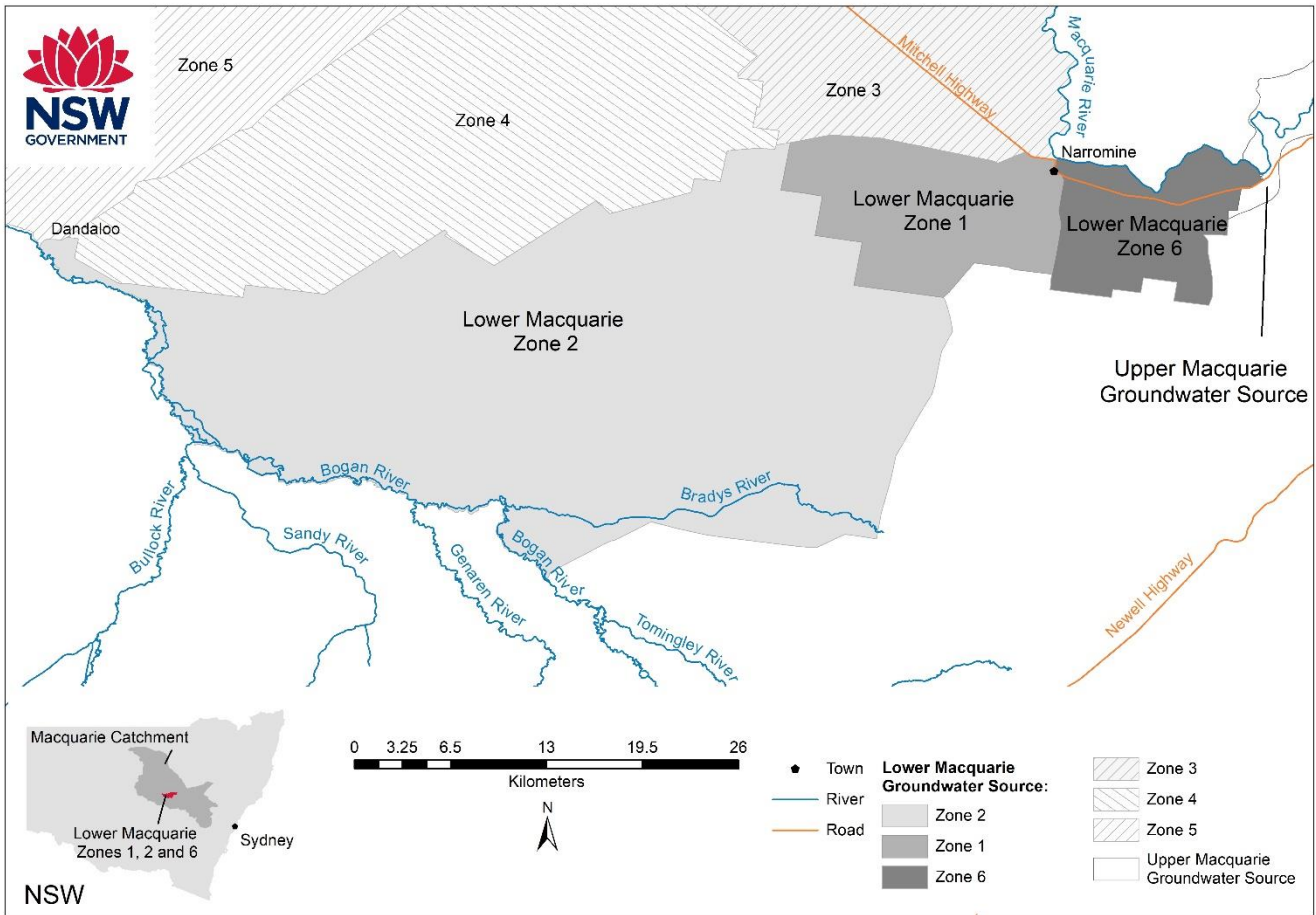
Water resource management

Water sharing plan

The Lower Macquarie alluvial groundwater sources are managed by the rules defined in the Water Sharing Plan for the Macquarie-Castlereagh Alluvial Groundwater Sources 2020.

The water sharing plans are available for viewing on the Department of Planning and Environment Water website at: www.industry.nsw.gov.au/water/plans-programs/water-sharing-plans/status/macquarie-castlereagh-region

Figure 1: Location map



Basic rights

Basic landholder rights are available in this groundwater source for domestic and stock watering requirements. Whilst landholders do not need an access licence to take water for stock and domestic purposes from groundwater underlying their property, the bore must be authorised by WaterNSW.

The volumes of water set aside in the water sharing plan for basic landholder rights are:

- Lower Macquarie Zone 1: 132 megalitres (ML)
- Lower Macquarie Zone 2: 151 ML
- Lower Macquarie Zone 6: 42 ML

An approval holder is responsible for monitoring water quality from the bore to ensure it is suitable for its intended purpose for the duration of the approval. Inherent water quality and land use activities may make the water in some areas unsuitable for use. Water from the groundwater sources should not be used without first being tested and, if necessary, appropriately treated to ensure it is fit for purpose. Such testing and treatment are the responsibility of the water user.

Groundwater access licences

Groundwater access licence share components to 30 June 2022 are presented in **Table 1**.

Table 1: Lower Macquarie alluvial groundwater sources share component at 30 June 2022

Groundwater Source	Lower Macquarie Zone 1		Lower Macquarie Zone 2		Lower Macquarie Zone 6	
	Number of Licences	Total Volume	Number of Licences	Total Volume	Number of Licences	Total Volume
Local Water Utility ¹	1	2,000	0	0	0	0
Aquifer ²	32	19,680	19	22,608	32	7,243

¹Megalitres/year (ML)

² Megalitres per unit share

Extraction limit

All groundwater sharing plans have rules to manage extraction in a water source to the long-term average annual extraction limit.

The extraction limits for the Lower Macquarie alluvial groundwater sources are listed in **Table 2**.

Table 2: Extraction limits for the Lower Macquarie alluvial groundwater sources

Water Source	Extraction limit (ML/year)
Lower Macquarie Zone 1 Groundwater Source	21,807
Lower Macquarie Zone 2 Groundwater Source	22,761
Lower Macquarie Zone 6 Groundwater Source	8,202

Extraction in the Lower Macquarie alluvial groundwater sources is not compliant if the 5 years average annual extraction is more than 105% of the extraction limit (known as the compliance trigger). If average extraction exceeds the compliance trigger, then the available water determination made for aquifer access licences for the following water year, may be reduced by an amount that would return subsequent total water extraction to the extraction limit.

Information on tracking groundwater extraction against extraction limit for the groundwater source including the likelihood of compliance being triggered in the current water year can be found at: www.industry.nsw.gov.au/water/allocations-availability/tracking-groundwater

For each inland groundwater source, the dashboard shows for the current water year:

- volume that if extracted will reach the compliance trigger (in ML, calculated annually)
- volume remaining to be extracted before reaching the compliance trigger (in ML, calculated throughout the year)
- the likelihood that access to groundwater may be reduced in the next water year

Note: the information on the dashboard is limited by the extraction data available at the time.

Available water

Total water availability in a water year is controlled by the available water determinations (AWD) credited to an access licence account, and the carryover rules that dictate the allowable volume to be brought forward from one year to the next.

Total available water for use is controlled by the annual account usage limits, which define the maximum volume of allocated water that can be taken in that water year. The rules and limits that are applicable to the Lower Macquarie alluvial groundwater sources Zones 1, 2 and 6 are provided in **Table 3**.

Table 3: Lower Macquarie alluvial groundwater sources access licence account rules

Access Licence Category	Carryover Limit	Annual Use Limit	Maximum AWD
Local Water Utility	0%	100%	100%
Aquifer	0.62 ML/share	1.44 ML/share	1 ML/share

The maximum amount of water that can be debited from an aquifer access licence account in a water year can't exceed 1.44 ML per unit share component (annual use limit), plus any allocation transferred in (temporary trade), and minus any allocation transferred out. This means that metered extraction plus transfers out cannot exceed 144% of the of share component, unless water is transferred in.

Total account water for period 2012/2013 to 2022/2023 is displayed in **Figure 2**, **Figure 3** and **Figure 4**, showing the proportion available for use and what is not available for use in a year. Total yearly extraction is also displayed. Note: all access licence categories have been combined in these figures.

There has been no reduction in the available water determination for aquifer access licences in the Lower Macquarie alluvial groundwater sources since the water sharing plan first started in 2006.

The access licence account information for the Lower Macquarie alluvial groundwater sources on 1 July 2022 is summarised in **Table 4**.

Table 4: Licence account information for Lower Macquarie alluvial groundwater sources on 1 July 2022

Lower Macquarie Groundwater Source	Zone 1	Zone 2	Zone 6
Carryover in:	12,112 ML	13,421 ML	4,491 ML
Available water determination:	21,680 ML	22,608 ML	7,243 ML
Total water in account:	33,792 ML	36,029 ML	11,734 ML
Total water available for use:	30,339 ML	32,220 ML	10,430 ML

Figure 2: Account water availability and usage summary for Lower Macquarie Zone 1 Groundwater Source

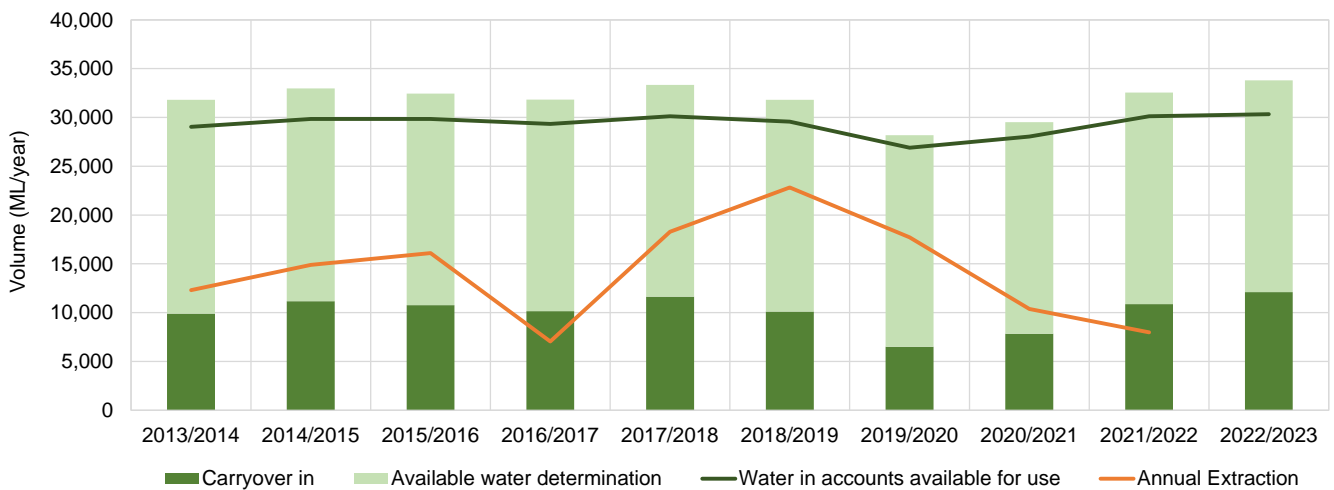


Figure 3: Account water availability and usage summary for Lower Macquarie Zone 2 Groundwater Source

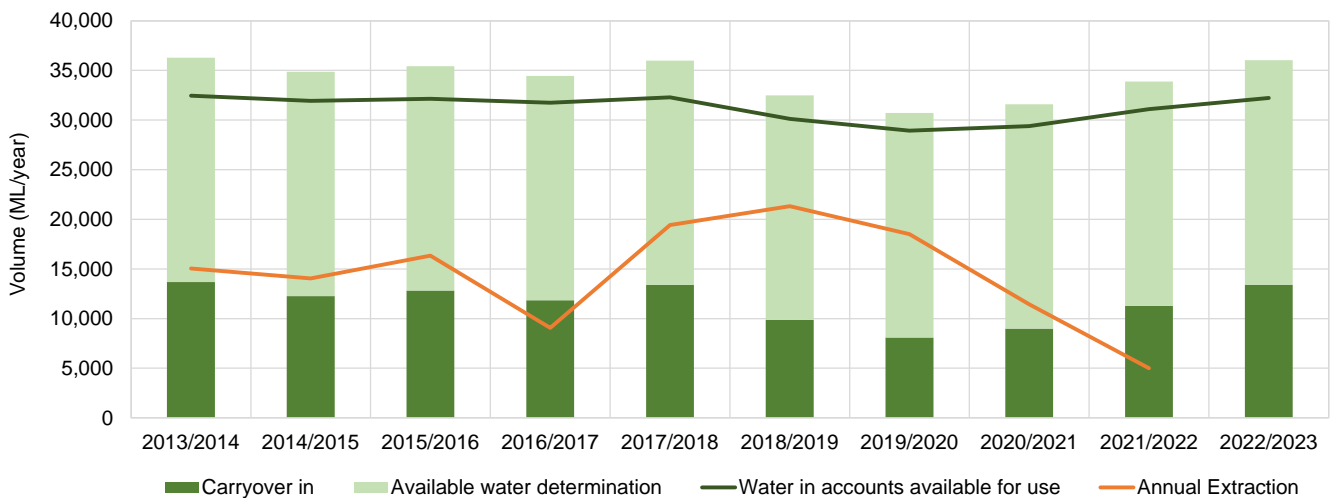
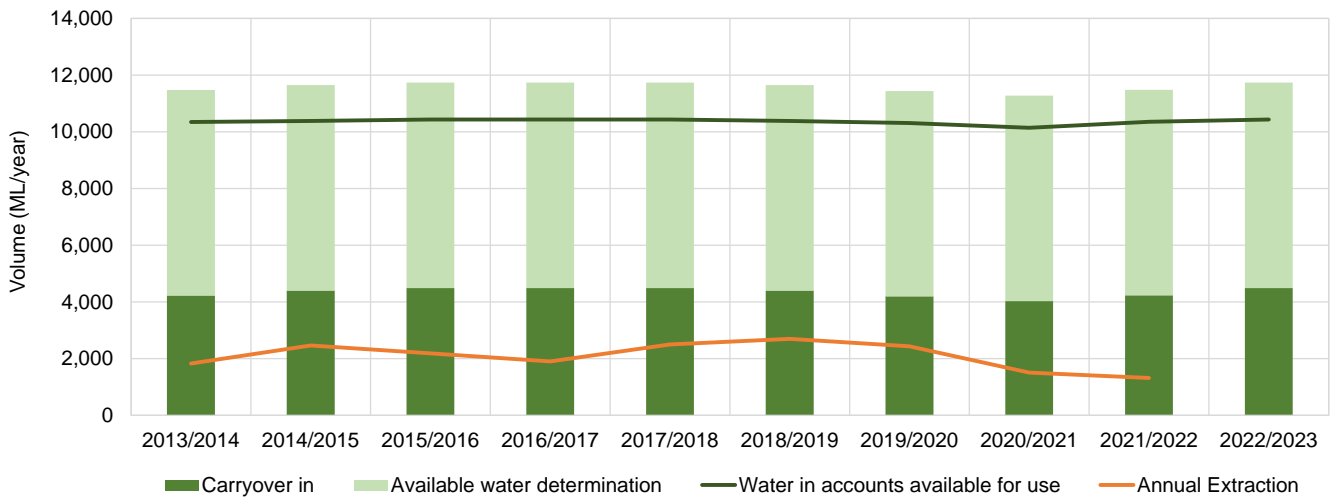


Figure 4: Account water availability and usage summary for Lower Macquarie Zone 6 Groundwater Source



Groundwater trading

Trades are permitted between the Lower Macquarie Zone 1, Lower Macquarie Zone 2 and Lower Macquarie Zone 6 groundwater sources subject to the rules in the water sharing plan. You cannot trade between the Lower Macquarie alluvial groundwater sources and any other groundwater sources.

Allocation assignments (temporary trade)

Trading statistics for the Lower Macquarie Zone 1 Groundwater Source and Lower Macquarie Zone 2 Groundwater Source are illustrated in **Figure 5** and **Figure 6** respectively; excludes trades for less than \$1 per megalitre. The value paid per megalitre in 2021-22 was \$50.

No allocation assignments have been recorded for the Lower Macquarie Zone 6 Groundwater Source.

Further information on water licences, approvals, water trade and water dealings and other matters related to water entitlements in NSW can be found on the NSW Water Register at:

waterregister.watarnsw.com.au/water-register-frame

Figure 5: Lower Macquarie Zone 1 Groundwater Source temporary trade statistics

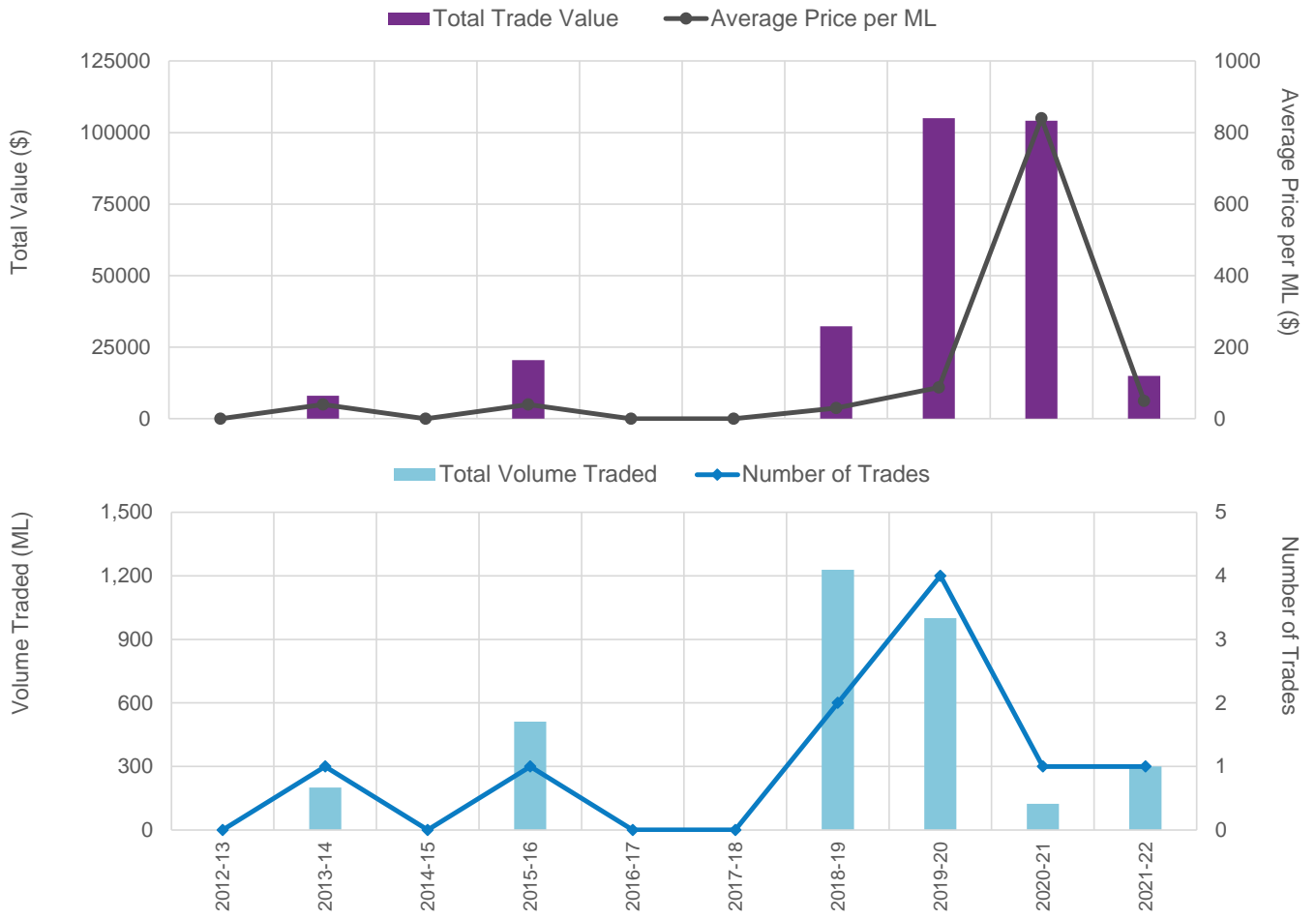
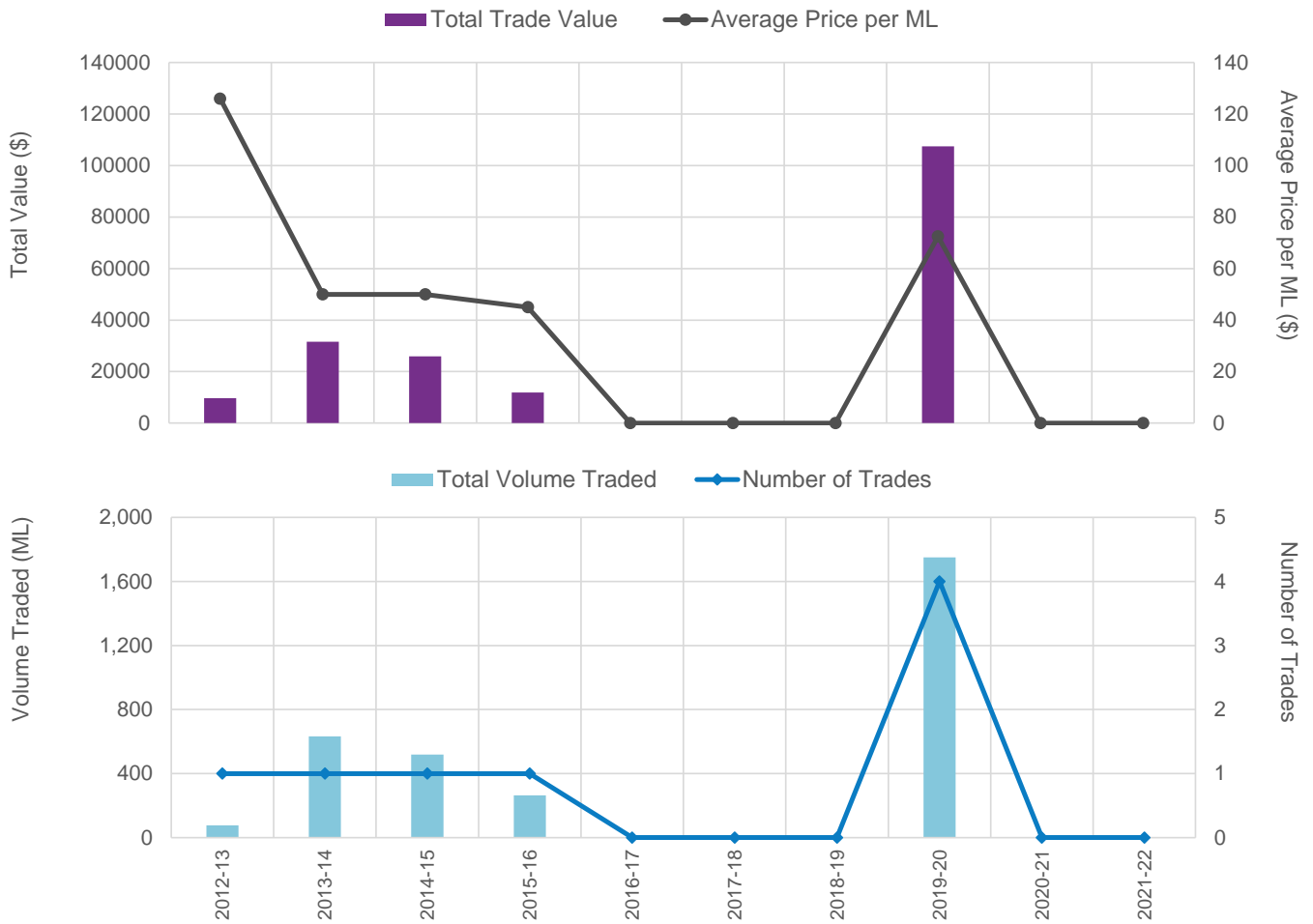


Figure 6: Lower Macquarie Zone 2 Groundwater Source temporary trade statistics



Bores

There are approximately 389 registered bores across the Lower Macquarie alluvial groundwater sources Zones 1, 2 and 6. (Figure 7). The majority of these bores are used for stock and domestic purposes (Basic Landholder Rights). There is also significant use of groundwater for irrigation (Table 5).

Average extraction from individual production bores is around 500 ML/year (Figure 8).

Table 5: Approximate number of licensed bores in Lower Macquarie alluvial groundwater sources (2022)

Groundwater Source	Registered Bore Purpose		
	Basic Landholder Rights	Production	Local Water Utility
Lower Macquarie Zone 1	58	43	10
Lower Macquarie Zone 2	74	30	0
Lower Macquarie Zone 6	131	43	0

Water level monitoring

WaterNSW monitors groundwater levels at 59 monitoring bores at 41 sites in the Lower Macquarie alluvial groundwater sources (deep) (Figure 9). At most monitoring sites there are two or more pipes monitoring different depths. The depth monitored by each pipe reflects the depth where the casing is slotted to allow groundwater entry into the pipe.

A hydrograph is a plot of groundwater level or pressure from a monitoring bore over time. A representative sample of hydrographs from monitoring bores have been selected and are presented in Figure 10 to Figure 20.

Data for the monitored bores as well as private bore information can be obtained from the WaterNSW real time data portal at: realtimedata.waternsw.com.au/

It includes data for 14 groundwater monitoring sites in real-time via telemetry. You can also request information via: Customer.Helpdesk@waternsw.com.au

Figure 7: Lower Macquarie alluvial groundwater sources Zones 1, 2 and 6 registered bores

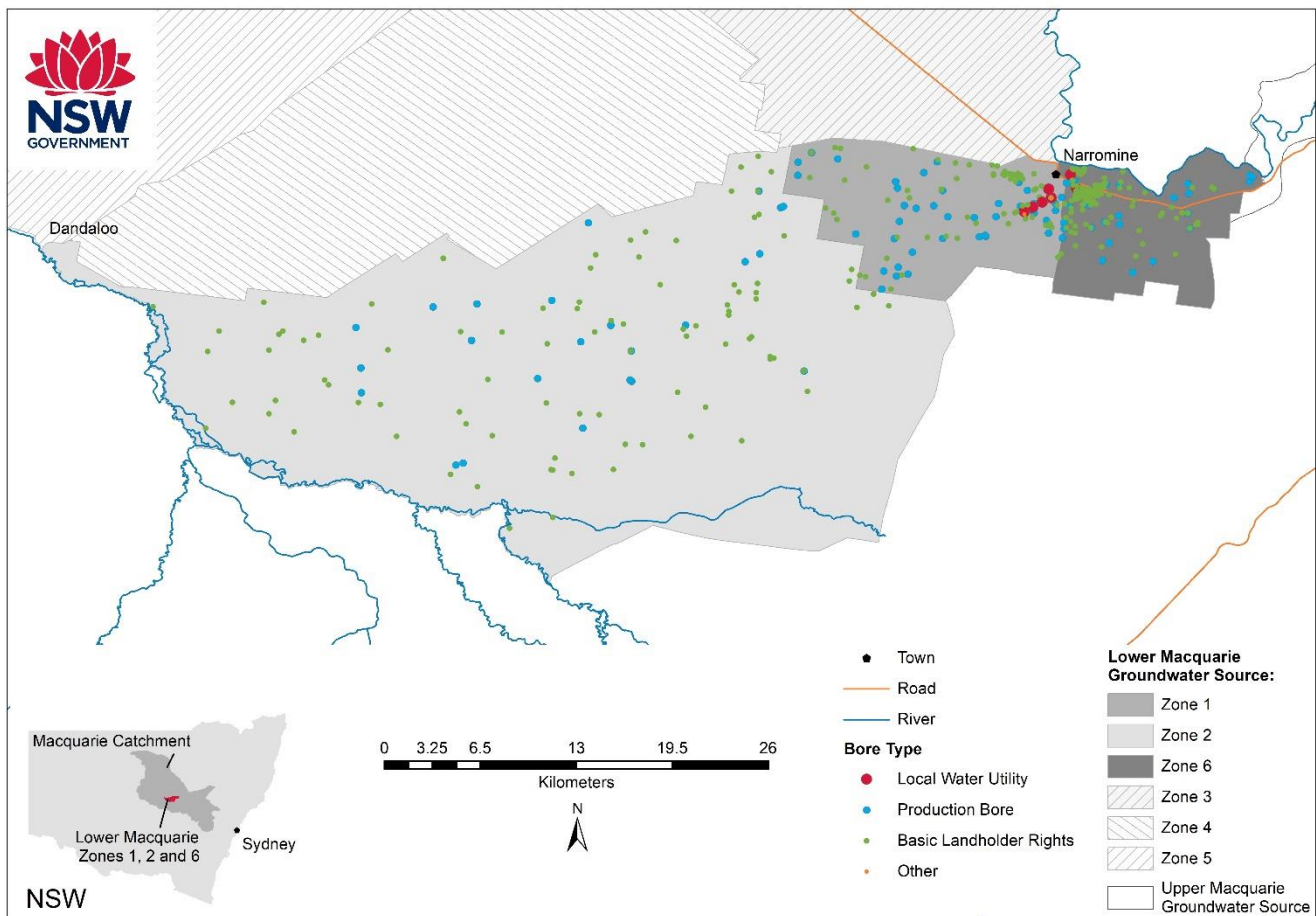


Figure 8: Lower Macquarie alluvial groundwater sources Zones 1, 2 and 6 water supply bores and distribution of extraction

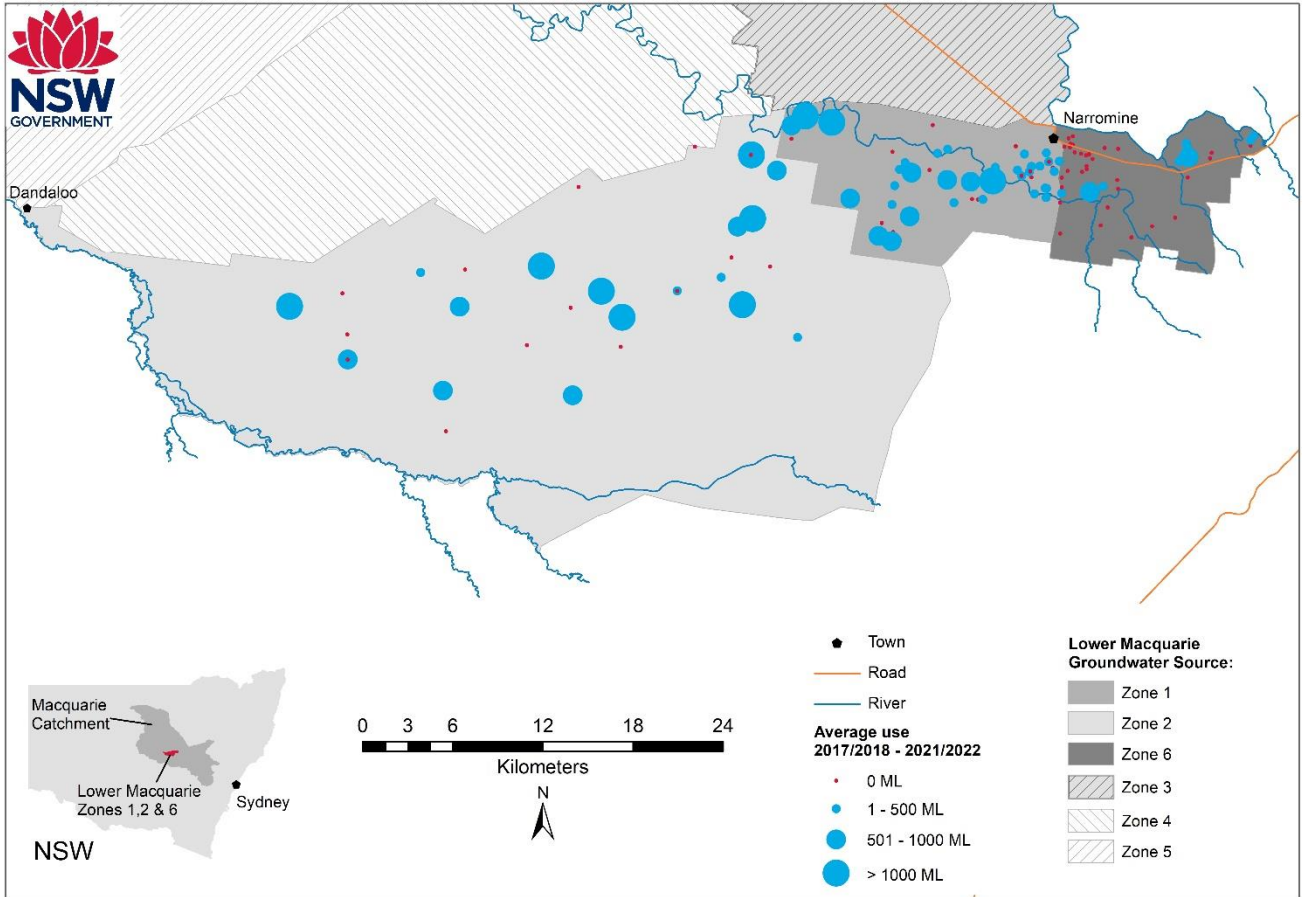


Figure 9: Lower Macquarie alluvial groundwater sources Zones 1, 2 and 6 monitoring bore sites

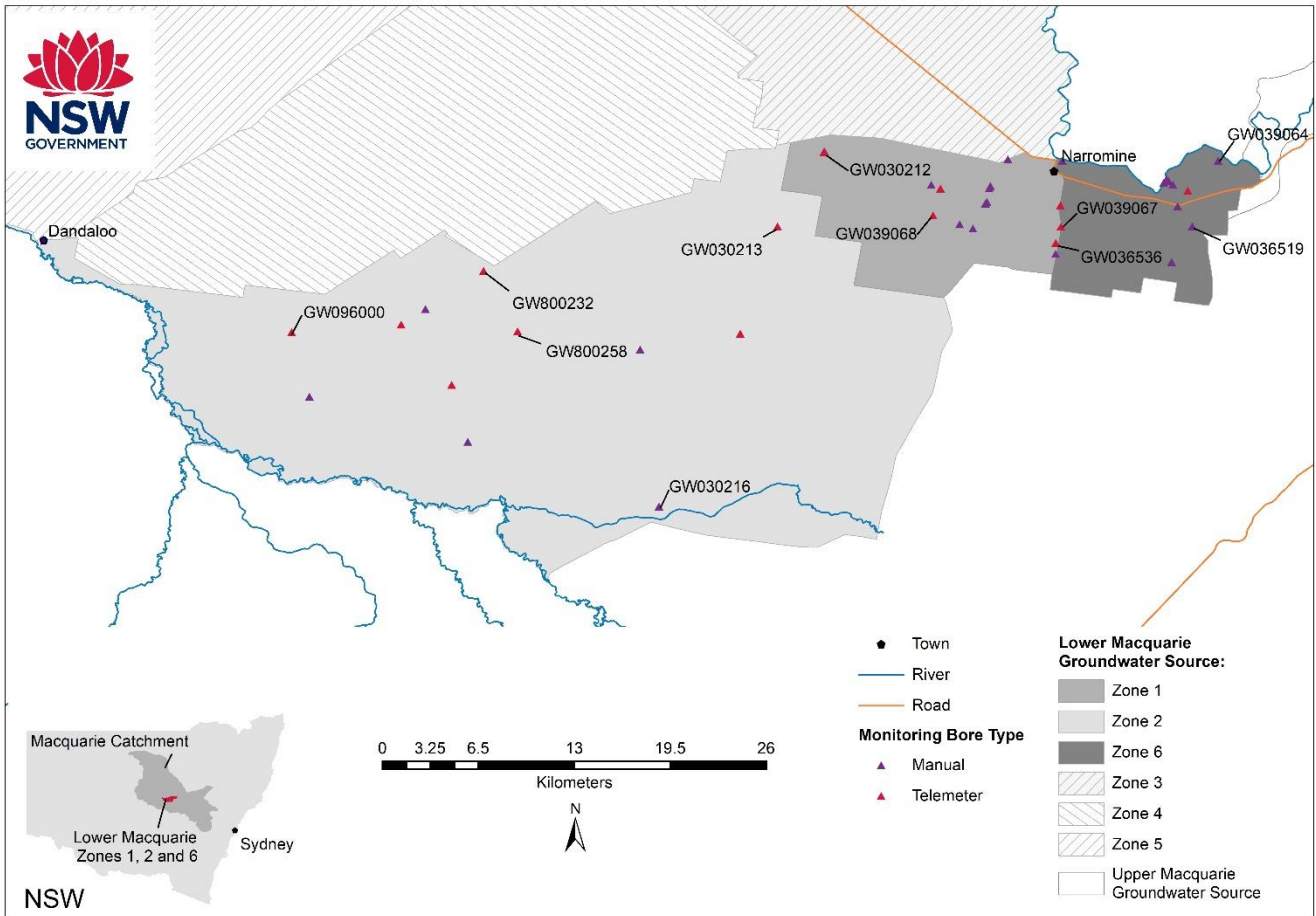


Figure 10: Hydrograph for monitoring bore GW036519 (Zone 6)

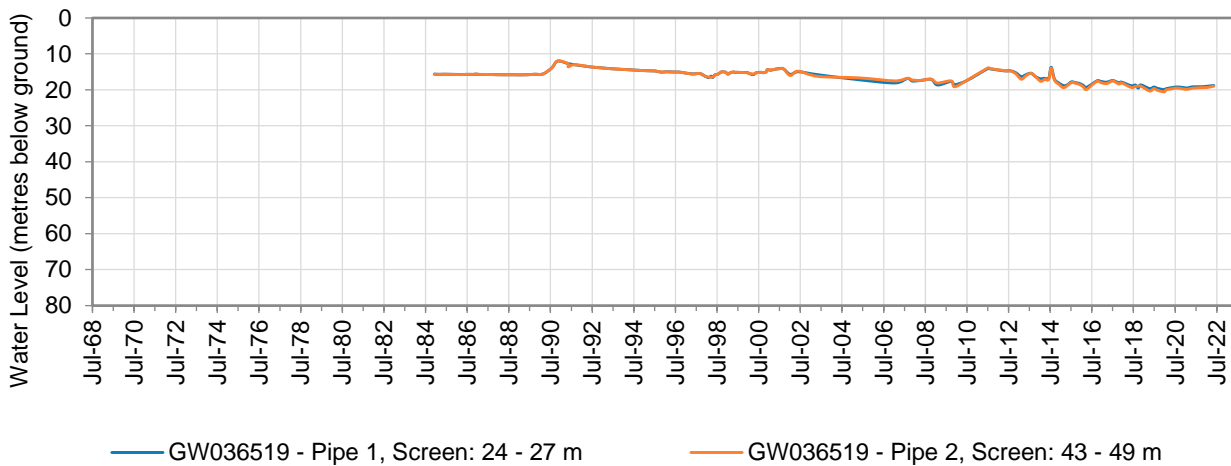


Figure 11: Hydrograph of monitoring bore GW039064 (Zone 6)

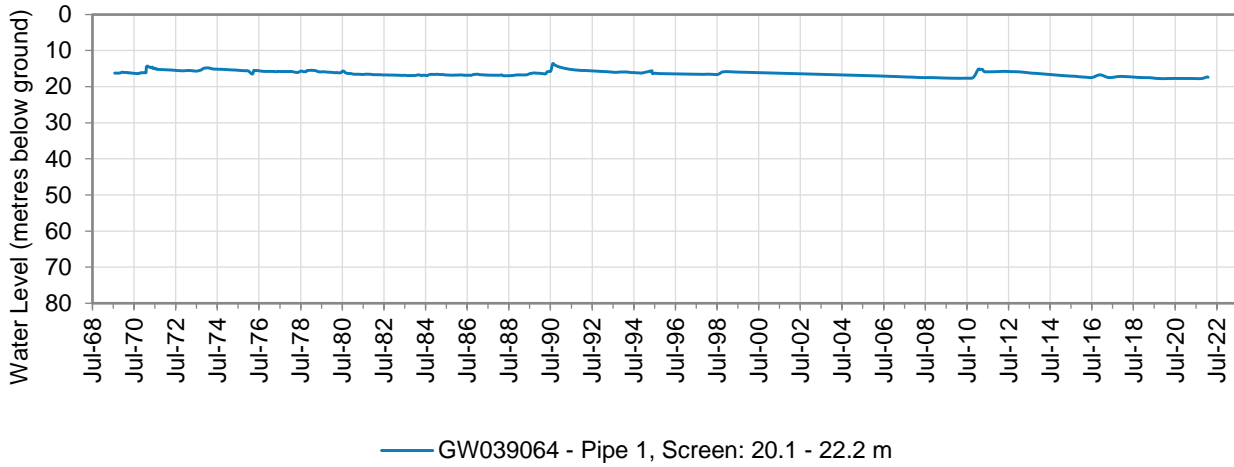


Figure 12: Hydrograph of monitoring bore GW039067

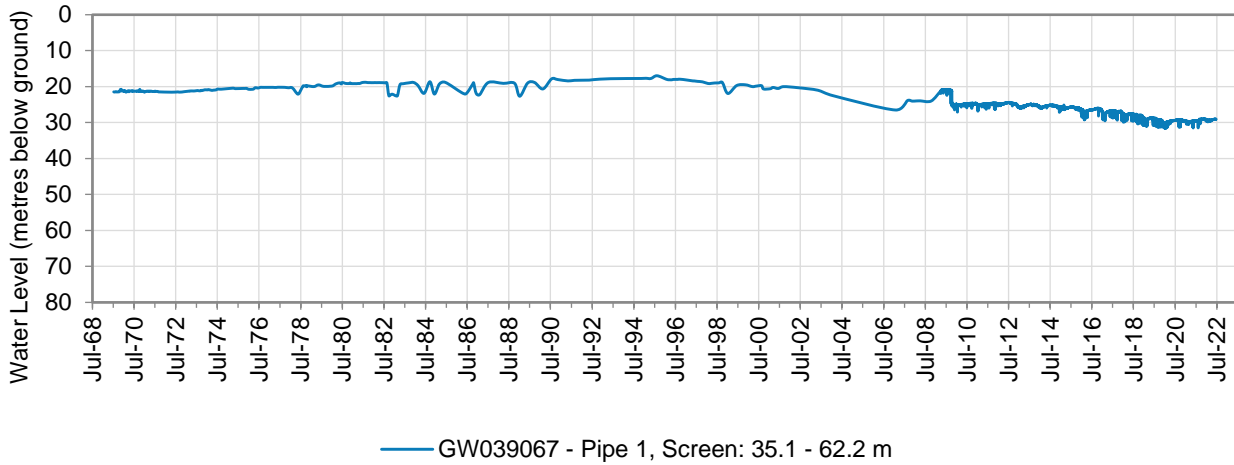


Figure 13: Hydrograph of monitoring bore GW036536 (Zone 1)

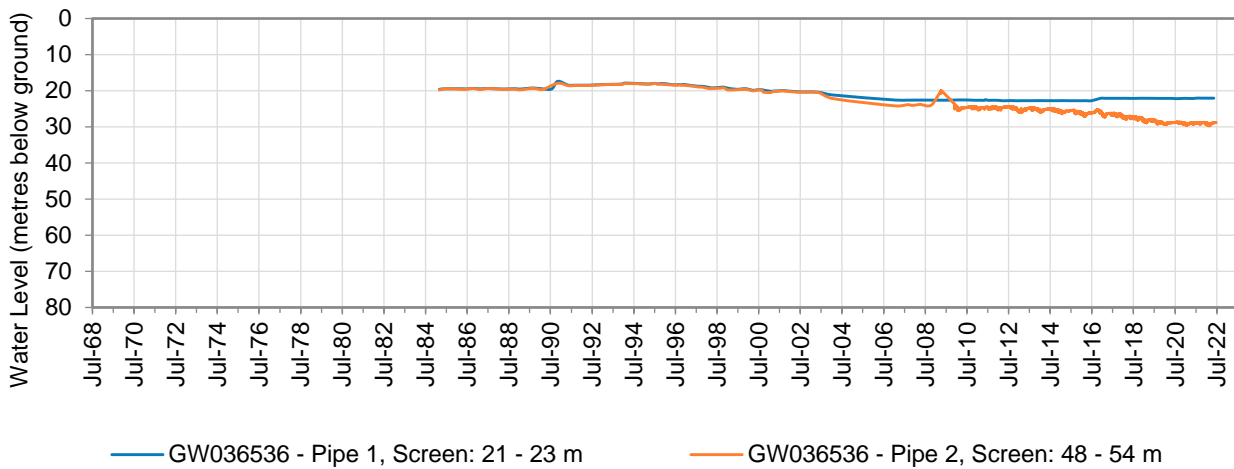


Figure 14: Hydrograph of monitoring bore GW030212 (Zone 1)

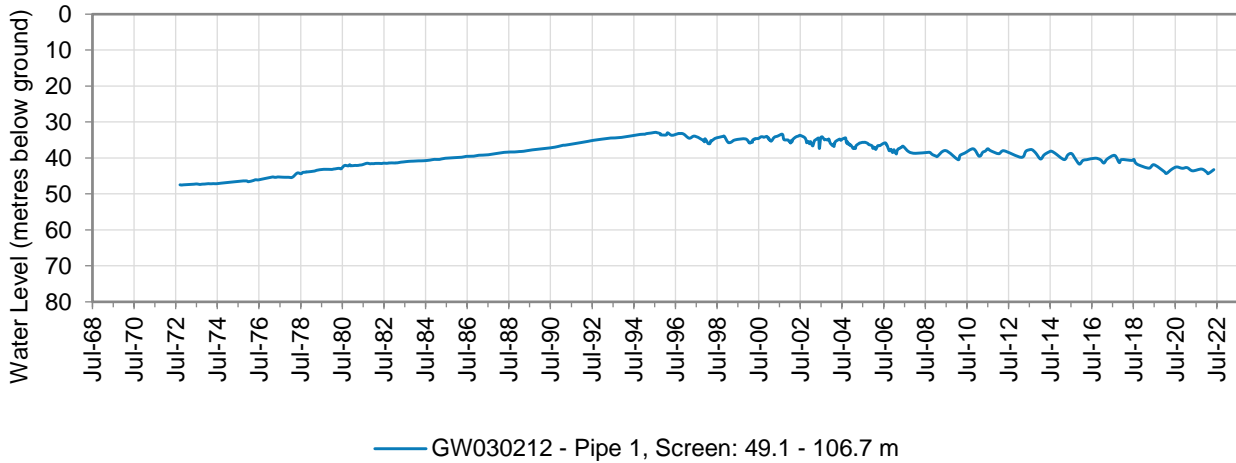


Figure 15: Hydrograph of monitoring bore GW039068 (Zone 1)

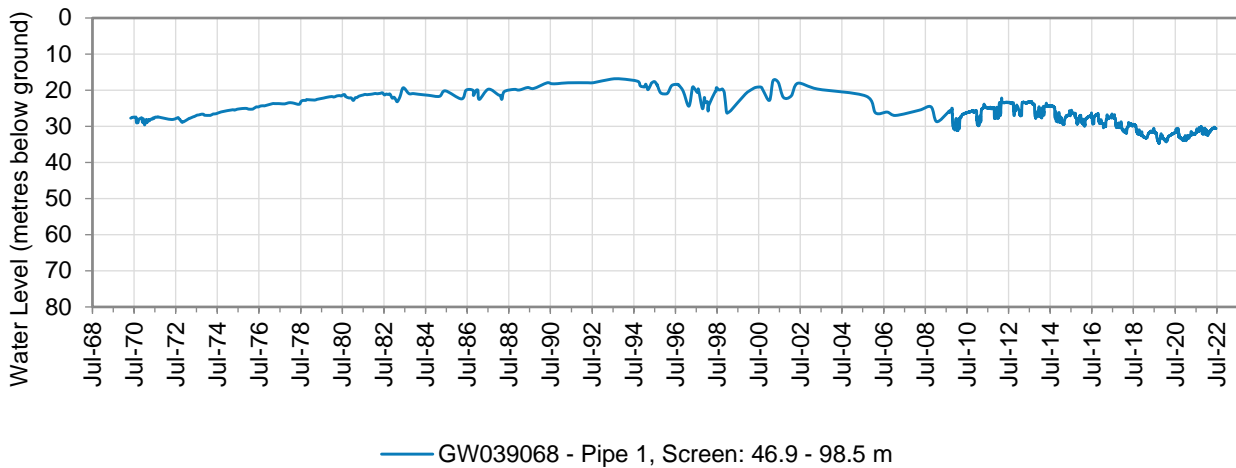


Figure 16: Hydrograph of monitoring bore GW030213 (Zone 2)

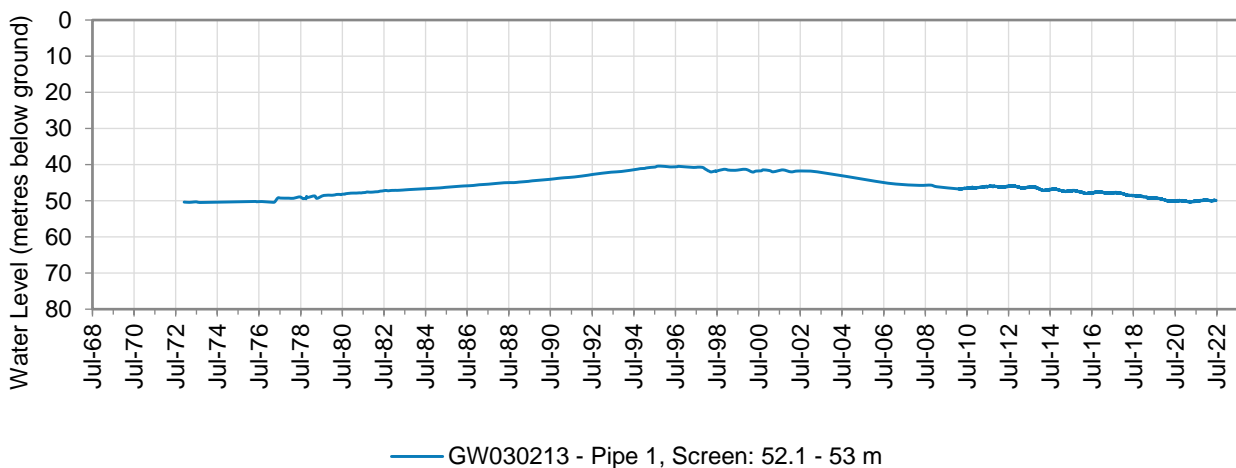


Figure 17: Hydrograph of monitoring bore GW800232 (Zone 2)

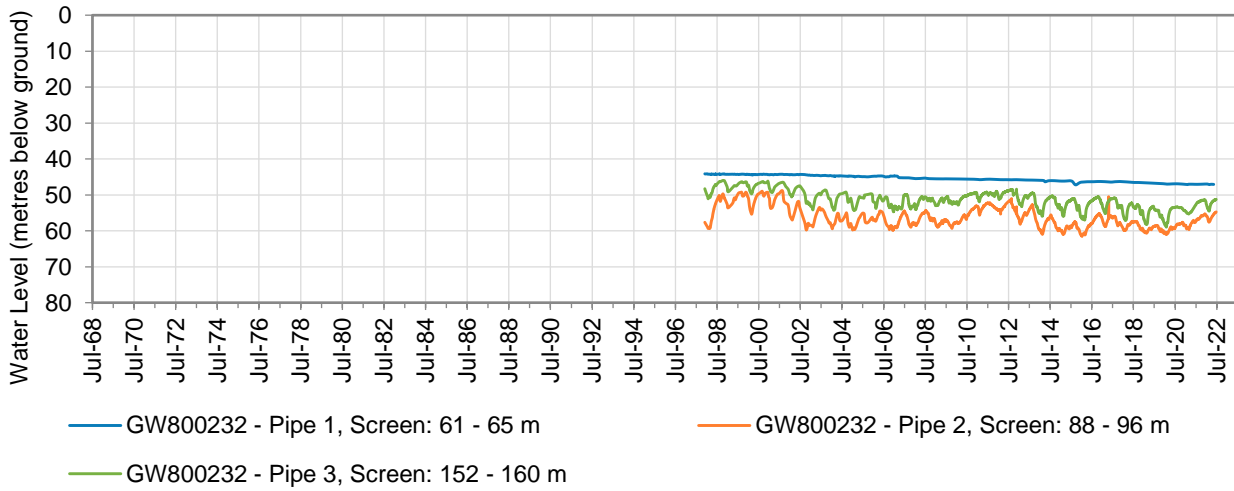


Figure 18: Hydrograph of monitoring bore GW800258 (Zone 2)

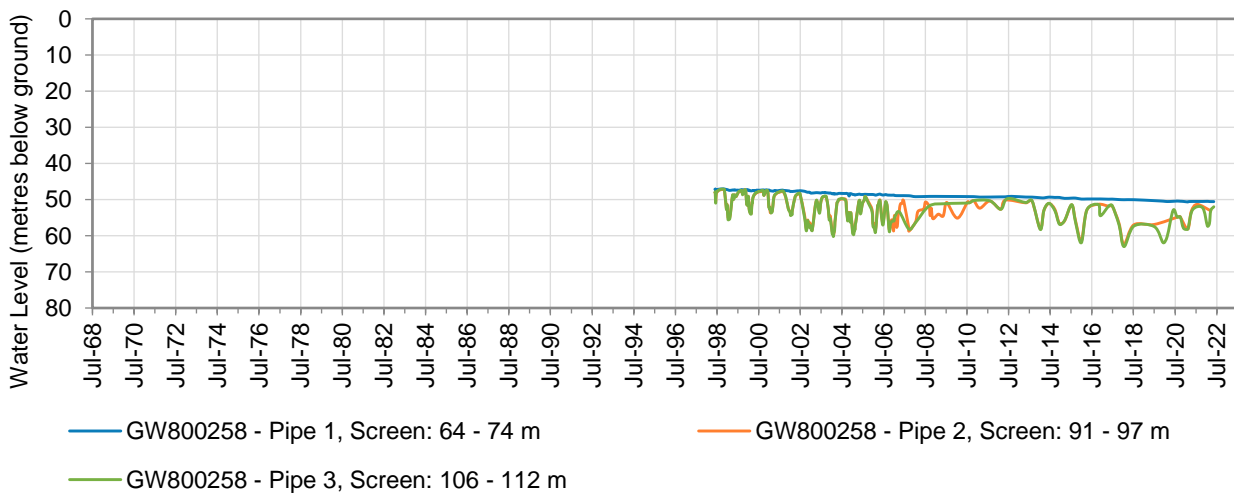


Figure 19: Hydrograph of monitoring bore GW030216 (Zone 2)

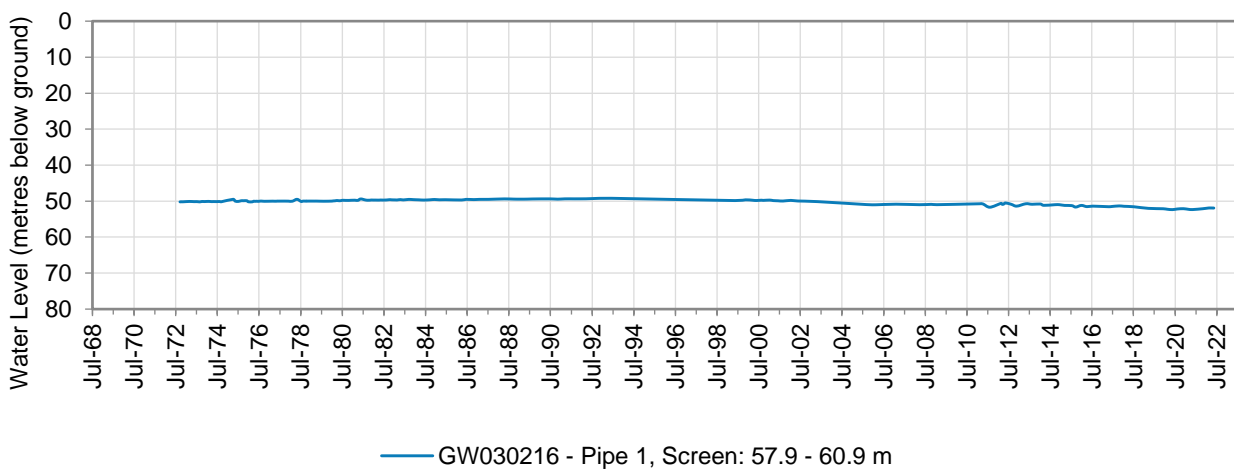


Figure 20: Hydrograph of monitoring bore GW096000 (Zone 2)

